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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/738,088	12/15/2000	Wayne A. Wong	042390.P9773	9639

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Sheryl Sue Holloway  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP  
12400 Wilshire Boulevard 7th Floor  
Los Angeles, CA 90025

EXAMINER

BRAGDON, REGINALD GLENWOOD

ART UNIT	PAPER NUMBER
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2188

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DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/738,088

Applicant(s)

WONG ET AL.

Examiner

Reginald G. Bragdon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other: .

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The Information Disclosure Statement(s) received 26 March 2001 has been considered.  
Please see the attached PTO-1449(s).

### ***Drawings***

2. The drawings filed on 15 December 2000 have been approved by the Examiner.

### ***Claim Objections***

3. Claims 5, 7, 13-14, and 19-20 are objected to because of the following informalities:  
  
As per claim 5, line 2, "misses" should be --miss addresses--.  
  
As per claim 7, line 4, --structure-- should be added after "data".  
  
As per claim 13, line 5, --structure-- should be added after "data".  
  
As per claim 19, line 2, --correlation-- should be added after "address".  
  
As per claim 20, line 2, --correlation-- should be added after "address".  
  
All dependent claims are objected to as having the same deficiencies as the claims they depend from.  
  
Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

--OR--

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

--OR--

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 5-10, 12-15, and 18-20 rejected under 35 U.S.C. 102(a) as being anticipated by Applicant's admitted prior art.

As per claims 1, 8, and 15, Applicant's admitted prior art (APA) teaches creating an address correlation between a preceding cache miss address and the current cache miss address, where the combination of the preceding cache miss address and the current cache miss address represents an "address set". See page 2, lines 19-21. The correlation is stored in a correlation predication table. See page 2, lines 21-22. APA also teaches a processing unit and a cache ("a memory"). See page 2, lines 10 and 19.

As per claims 2, 9, and 18, Applicant's admitted prior art teaches using the key (corresponding to the preceding cache miss address) on a cache miss to predict the successor address will be the next cache miss and prefetches the successor address. See page 2, lines 19 and 22-24.

As per claims 3 and 10, APA teaches storing a plurality of correlations. See page 2, lines 15-16.

As per claims 5 and 19, APA teaches at page 2, line 20, that the current and previous addresses are cache miss addresses.

As per claims 6 and 20, APA teaches on page 2, line 10, that the address correlations can be used to predict the addresses of future instructions.

As per claims 7 and 13, APA teaches using a least recently used replacement policy to maintain the correlation values (“determining a slot in a set correlation data structure...”; see page 3, lines 2-3), and that the previous address is used as the key for the correlation. See page 2, lines 20-22.

As per claim 12, APA teaches a current cache miss address as a successor value (“address set field containing data representing the address set”) and a previous cache miss address as a key value (“previous address field...”). See page 2, lines 20-22.

As per claim 14, APA teaches a current cache miss address as a successor value (“successor address field”) and a previous cache miss address as a key value (“key address field...”). See page 2, lines 20-22.

6. Claims 1-3, 5, 7-10, 12-16, and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Alexander et al. “Distributed Prefetch-Buffer/Cache Design for High Performance Memory System”.

As per claims 1, 8, and 15, Alexander et al. teaches on page 256 (figure 1), creating a correlation between a current address and a previous address and storing the correlation in a table. Inherently Alexander et al. teaches a processing unit and a memory.

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As per claims 2, 9, and 18 Alexander et al. teaches retrieving a correlation when the previous address is observed in the instruction stream. See figure 1-D.

As per claims 3 and 10, Alexander et al. teaches a prediction table, storing a plurality of correlations.

As per claims 5 and 19, Alexander et al. teaches on page 254, right column, predicting cache misses.

As per claims 7 and 13, Alexander et al. teaches with reference to figure 1, determining a slot to store a correlation and keying the correlation based on the previous address.

As per claims 12 and 14, Alexander et al. teaches a previous/key address field in the prediction table and an address set/successor field in the prediction table. For example, see 1-F, where for the pair b,d, b is the key/previous address and d is the address set/successor address.

As per claim 16, Alexander et al. teaches a read requests stack ("set address history data structure") which stores the previous address.

7. Claims 1-4, 12-15, and 17-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Uchihori (6,516,389).

As per claims 1, 8, and 15, Uchihori teaches a pre-fetch prediction table in a system including a host computer 20 ("processing unit") and a hard disk drive 11. A correlation is created between an area address ("previous address") and a prediction address ("current address"). The correlation is stored in the pre-fetch prediction table 122.

As per claims 2, 9, and 18, Uchihori teaches pre-fetching data from the hard disk drive when a read address matches an address in the pre-fetch prediction table 122. See the abstract.

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As per claims 3 and 10, Uchihori teaches a plurality of correlation pairs in the pre-fetch prediction table.

As per claims 4 and 11, Uchihori teaches recording an address in a previous access register 123a (step S11, figure 3), uses this address when a next address is to be added to the prediction table (step S12), and replaces the entry with the area address accessed this time (step S16).

As per claims 7 and 13, Uchihori teaches using a least recently used method to select a entry in the pre-fetch prediction table (“determining...”) to store a correlation. See column 7, lines 47-50.

As per claims 12 and 14, Uchihori teaches an area address field (“key” or “previous”) and a prediction address (“successor” or “current”) field as shown in figure 1.

As per claim 17, Uchihori teaches that the hard disk drive has a plurality of areas.

### ***Conclusion***

8. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

All “OFFICIAL” patent application related correspondence transmitted by FAX must be directed to the central FAX number at **(703) 872-9306**:

“INFORMAL” or “DRAFT” FAX communications may be sent to the Examiner at **(703) 746-5693**, only after approval by the Examiner.

Hand-delivered responses should be brought to Crystal Park II, 2121  
Crystal Drive, Arlington, VA., Fourth Floor (receptionist).

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reginald G. Bragdon whose telephone number is (703) 305-3823. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM and every other Friday from 7:00 AM to 3:30 PM.

The examiner's supervisor, Mano Padmanabhan, can be reached at (703) 306-2903.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

RGB  
October 31, 2003

*Reginald G. Bragdon*

Reginald G. Bragdon  
Primary Patent Examiner  
Art Unit 2188